REMARKS:

The withdrawal of claims 3, 9 and 20 as not directed to the elected species is acknowledged.

Claims 1, 2, 8, 14, 15, 26, 28, 29, 36 and 48 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 5,943,454 to Aksyuk et al. ("Aksyuk"). Some of the rejected claims have been amended and the rejection is traversed in so far as it is applied to the claims as amended.

Claim 1 has been amended to require that the actuator rotate the surface about one or more axes transverse to one or more beams of radiation to each of a plurality of positions and that the surface at each of the positions reflects substantially all of the radiation passed by the filter, and directs a selected corresponding portion of the reflected radiation to the selected channel(s) in the second set of output optical channels. Amended claim one differs radically from Aksyuk in several respects as explained below.

Aksyuk discloses a bypass-exchange switch that relies on an optical director that is operable to change the path of the optical signal through the switch and thereby provide the switching function. Column 1, lines 43-46. In one embodiment, the optical director is a variable reflectivity mirror operating in a transmissive mode. At its minimum reflectivity state, the variable directivity mirror is invisible to optical signals so that the signals pass unimpeded to output in the exchange state. When the mirror is in its maximum reflectivity state, a substantial portion of the optical signals is reflected in the bypass state. In a different embodiment, the optical director is a constant reflectivity mirror that is moved into or out of the path of optical signals in the two states. Therefore, in all of the embodiments of the bypass-exchange switch of Aksyuk, the optical director transmits signals (either by having minimum reflectivity or by being moved out of the optical path) in the exchange state, and reflects the optical signals (by being in the maximum reflectivity state or by being in the optical path) in the bypass state. Hence, Aksyuk envisions that in at least one of the states in all of the embodiments, the optical signal is transmitted through the optical director substantially unimpeded by the director. This is not the case at all in the device of claim 1. In the claim 1 device, the actuator rotates the surface to each of a plurality of positions, wherein at each of such positions,

the surface reflects substantially all of the radiation passed by the filter and directs a selected corresponding portion of the reflected radiation to selected channel(s). In other words, in the claim 1 device, all of the radiation is reflected by the reflective surface in all of the operating states of the device, wherein as in Aksyuk, in at least one operating state (exchange state), a substantial portion of the optical signal is transmitted through the optical director.

Furthermore, claim 1 requires that the reflective surface be rotated by the actuator, whereas in Aksyuk, the different operating states of the switch is achieved either by changing the transmissive state of the optical director or by moving a mirror into or out of the optical path in a linear motion.

It is believed to be well settled that in order for a reference to anticipate a claim, there must be identity of elements between those of the reference and those of the claim. It is clear therefore that Aksyuk fails to anticipate amended claim 1 for the reasons explained above.

In view of the vast differences between the operation principles underlying the Aksyuk device and those of amended claim1, it is further believed that amended claim 1 in nonobvious over Aksyuk. Thus, in all of the embodiments of Aksyuk, the bypass-exchange switch is Aksyuk must operate in a transmissive mode where at least a substantial portion of the optical signal be transmitted through the optical director. This is radically different from the claim 1 device where the different states are achieved by rotating the reflective surface which reflects substantially all of the radiation in all of the different operating states. There is therefore no reason or motivation for one skilled in the art to arrive at the device of amended claim 1 starting from that of Aksyuk. Claim 1 is therefore believed to be allowable over Aksyuk.

For substantially the same reasons as those explained above for claim 1, claims 6, 7 and 48 are likewise believed to be allowable over Aksyuk. Claims 2, 8, 14, 15, 26, 28, 29, and 36 are believed to be allowable since they depend from allowable claim 1.

Claims 1, 2, 6, 7, 15-17, 33, and 47-49 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 4,498,730 to Tanaka et al. (Tanaka). The rejected is traversed in so far as it is applied to the claims as amended.

Claims 1 and 47-49 have been amended to require the reflective surface or filter be rotated by the actuator about one or more axes transverse to the one or more beams. As amended, these claims differ radically from Tanaka as explained below.

In the optical switch in Fig. 5 of Tanaka, both the reflective surface 21 and the filter 31 are rotated about an axes 32 which is parallel to the optical beam (column 4, lines 48-51). In the amended claims 1 and 47-49 however, the reflective surface or filter is rotated about one or more axes transverse to the optical beams. This difference is significant and has serious implication for the fabrication and accuracy of the switch. In reference to Fig. 5 of Tanaka, it is apparent that in order for an optical signal in the central waveguide 23 to be reflected by either the filter 31 or mirror 21 to the correct waveguide amongst the output waveguide 24-29, the position of the filter and mirror and the amount of rotation must be controlled accurately. However, once the positions of the mirror and filter are set initially, the only degree of freedom for adjusting the direction in which the input optical signal is by the amount of rotation of the filter or mirror about axis 32. For certain applications, such single degree of freedom of adjustment may not be adequate, with the result that the reflection of the input optical signal reaches the wrong waveguide, or that the wrong proportion of the reflected input signal reaches the intended recipient waveguide, resulting in undesirable incorrect attenuation of the signal. For many optical applications, it is important to have great flexibility in further adjusting the direction of reflection after the initial alignment. Tanaka's switch does not provide such flexibility. Hence it may be difficult to use Tanaka's switch for such applications.

In contrast, in the system of claims 1 and 47-49, the reflective surface is rotated about one or more axes transverse to the one or more beams that is conveyed by the system. Since the rotation axis is transverse to the propagation direction of the optical signal, the system of claim 1 provides the flexibility where the reflective surface can be rotated about two or more different axes in order to align the optical signal reflected by the reflective surface, in order to direct the reflected signal to the correct output optical channel, with the desired amount of attenuation, if any. This is illustrated, for example, in the embodiment of Figs. 1 and 7. As shown in Fig. 7, the mirror 300 may be rotated about torsion bars 310 and 320. While the system of claims 1 and 48 permits rotation about more than one axes, this is not required for all applications, so that rotation about a

single axis transverse to the beams may be adequate; claims 1 and 48 cover all such different variations.

Similar to claims 1 and 48, in claims 47 and 49, the rotation axis of the filter is transverse to the propagation direction of the optical signal. Hence, the system of claim 47 and 49 provides the flexibility where the filter can be rotated about two or more different axes in order to align the optical signal reflected by the reflective surface, in order to direct the reflected signal to the correct output optical channel, with the desired amount of attenuation, if any. From the above, it is evident that there is no identity of elements between Tanaka and those of claims 1 and 47-49.

Furthermore, in view of the vast differences between those of Tanaka and those of the rejected claims, it is further believed that claims 1, 47-49 are nonobvious over Tanaka.

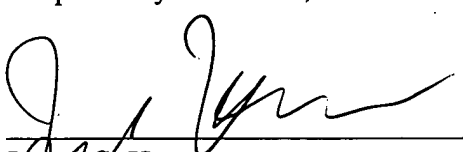
Claims 2, 6, 7, 15-17 and 33 are believed to be allowable since they depend from allowable claims.

Claims 8, 12, 13, 30 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka. Claim 31 has been cancelled. The rejection is respectfully traversed as applied to claims 8, 12, 13 and 30. These claims as well as claim 32 are believed to be allowable since they depend from allowable claims.

The Examiner's indication that claim 27 will be allowable if rewritten in independent form is noted with appreciation. This has not been done since the claim upon which it depends is also believed to be allowable.

Claims 1, 2, 6-8, 12-17, 26-30, 32, 33, 36 and 47-49 are presently depending in the application, Reconsideration of the rejections is respectfully requested and an early indication of the allowability of all the claims is earnestly solicitated.

Respectfully submitted,



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